

(2) subjecting the vegetable protein material to enzymatic hydrolysis with the fungal culture first at a temperature ranging from 15 °C to 39 °C with aeration and agitation; and

(3) completing the enzymatic hydrolysis of the vegetable protein material at a temperature ranging from 40 °C to 60 °C,

to obtain the hydrolyzed protein.

The inventors have discovered that the presently claimed methods are particularly effective for producing a protein hydrolyzate which is not browned and which resists browning for a prolonged period of time.

The cited references contain no disclosure which would suggest the presently claimed methods or the advantages afforded thereby. Accordingly, these references cannot affect the patentability of the present claims.

The rejection of Claims 1-3 and 5 under 35 U.S.C. §102(b) in view of U.S. Patent No. 6,045,819 (Takebe et al) or WO 95/2885 (Muller et al); the rejection of Claims 1-5 under 35 U.S.C. §102(b) or, in the alternative, under 35 U.S.C. §103(a) in view of Takebe et al or Muller et al in view of U.S. Patent No. 3,655,396 (Goto et al), JP 50-019996 (Kikkoman) and/or Muramatsu et al; and the rejection of Claims 1-6 under 35 U.S.C. §103(a) in view of Takebe et al or Muller et al in view of Goto et al, Kikkoman and/or Muramatsu et al, and further in view of U.S. Patent No. 5,888,561 (Niederberger et al) are respectfully traversed.

At lines 4 to 9, on page 4 of the Office Action, the position is taken that Takebe et al discloses a method of producing hydrolyzed protein from vegetable protein by mixing a fungal culture with a vegetable material and then conducting a first stage fermentation at a temperature of 28 °C to 30 °C, and then conducting a second stage fermentation at a temperature of 30 °C to 65 °C. However, this understanding is not correct, because the first stage fermentation at a temperature of 28 °C to 30 °C is for preparing the koji. In support of

this assertion, the Examiner's attention is directed toward col. 9, line 55, to col. 10, line 2, of Takebe et al, where it is disclosed:

That is the defatted soybean already cooked is inoculated with a *koji starter* comprising koji mold at a predetermined weight ratio, mixing is conducted to uniformness.

Then the mixture is placed into a *device for preparing koji* and kept in such a heated condition that the initial temperature is about 28 to 30 °C. for a predetermined period of time to ferment the defatted soybean having a water content as low as 40 % by weight with the koji mold, *thereby effecting koji preparation* .....\*

\*emphasis added.

Thus, the step of fermentation at 28 °C to 30 °C in Takebe et al is for preparation of the koji, not the hydrolysis of a vegetable protein material with koji. In fact, there is no disclosure or suggestion in Takebe et al of hydrolyzing a vegetable protein material first at a temperature ranging from 15 °C to 39 °C with aeration and agitation, and then conducting and completing the hydrolysis at a temperature ranging from 40 °C to 60 °C.

inoculum or  
obtain  
energy  
of  
fungal  
mass  
with  
enzymes.

In sharp contrast, the present claims explicitly recite that the claimed method involves:

“(2) subjecting said vegetable protein material to enzymatic hydrolysis with said fungal culture first at a temperature ranging from 15 °C to 39 °C with aeration and agitation; and

(3) completing said enzymatic hydrolysis of said vegetable protein material at a temperature ranging from 40 °C to 60 °C.”

Since Takebe et al contains no disclosure or suggestion of hydrolyzing a vegetable protein material first at a temperature ranging from 15 °C to 39 °C with aeration and

agitation, and then conducting and completing the hydrolysis at a temperature ranging from 40 °C to 60 °C, this reference cannot anticipate or make obvious the present claims.

Moreover, contrary to the statement on page 4 of the Office Action, the koji prepared in Takebe et al is clearly in a form of *solid* koji. The step of conducting fermentation at the initial temperature of 28°C to 30°C in Takebe et al (col. 9, line 60) is for koji preparation.

Prior to this step, the water content in the de-fatted soybean is adjusted to a level to allow the koji mold to propagate, for example, 40% by weight (col. 8, lines 62-65). It is clear that the de-fatted soybean having a water content as low as 40% by weight (col. 9, lines 61-62) is in a solid state. After the solid koji is prepared, i.e., the koji mold is propagated on and into the de-fatted soybean (col. 10, lines 18-19), water is added to the product from the koji preparation, and the mixture is kept at a temperature of 30°C to 65°C (col. 10, line 66) or 50°C (col. 11, line 56 and col. 12, line 2) to hydrolyze proteins. In this step, the amount of water to be added is the same weight as that of the resulting product (col. 11, lines 54-55 and col. 11, line 67 to col. 12, line 1), and the hydrolysis is performed in a liquid reaction system accordingly.

Muller et al discloses a method for producing a seasoning sauce comprises mashing a fungus-covered, enzyme-containing koji substrate of divided bread with an enzymatic, salt-containing wheat gluten hydrolyzate in the form of a suspension, and carrying out the fermentation in several steps, starting at 30 to 35°C, via 40 to 45°C in a later step to room temperature in the last step. Thus, the koji, i.e., fungal culture used as the enzyme source, prepared in Muller et al is clearly a *solid* koji, whereas the koji employed in the present invention is a *liquid* koji. In the paragraph bridging pages 3 and 4 of the Official Action, it is stated that the method disclosed in Muller et al encompasses the use of liquid reaction by "teaching the use of liquified gluten suspension or spore suspension." However, the "spore

suspension” in Muller et al is used only for preparing a solid koji, i.e., inoculating into bread (see, page 9, paragraph 2, line 14 in Muller et al), and the prepared solid koji is then mashed into the liquified gluten suspension (see, page 9, paragraph 3 in Muller et al). The thus prepared mashed mixture is not “a liquid reaction system” as recited in Claim 7 of the present application.

? Furthermore, the use of a **liquid** koji in the presently claimed method results in a great improvement with respect to the time required for the hydrolysis of the vegetable protein material. For example, the enzymatic hydrolysis is completed in the 24 hours in Examples 1 and 2 in the present application (see, pages 22-32), whereas the fermentation is carried out for as long as 1 to 8 weeks in Muller et al. (besides it talks about maturation not completion)

but not 48 hrs  
Since Muller et al contains no disclosure or suggestion of using “a liquid reaction system” or a “liquid koji” as recited by the present claims, this reference cannot anticipate or make obvious the present claims.

Applicants submit that none of the remaining references can cure the basic deficiencies of the primary references (Takebe et al and Muller et al). Specifically, none of Goto et al, Kikkoman, Muramatsu et al, or Niederberger et al contains any disclosure which would remotely suggest using “a liquid reaction system” or a “liquid koji” in a process for hydrolyzing a vegetable protein material in a process involving:

(1) mixing a dispersion of the vegetable protein material with the fungal culture wherein the fungal culture is in a form of liquid koji;

(2) subjecting the vegetable protein material to enzymatic hydrolysis with the fungal culture first at a temperature ranging from 15 °C to 39 °C with aeration and agitation; and

(3) completing the enzymatic hydrolysis of the vegetable protein material at a temperature ranging from 40 °C to 60 °C,

to obtain said hydrolyzed protein.

Thus, these references, even in combination cannot make the present claims obvious.

Accordingly, these rejections are no longer tenable and should be withdrawn.

The rejection of Claims 1-6 under 35 U.S.C. §112, second paragraph, has been obviated by appropriate amendment. As the Examiner will note, Applicants have rewritten the claims such that they are free of the criticisms outlined on pages 2-3 of the Official Action. Accordingly, this rejection is no longer proper and should be withdrawn. Applicants expressly state on the record that these amendments were made solely for the purpose of clarity and were neither made nor necessary to distinguish the present claims from the prior art.

In regard to new Claim 10, Applicants state that the term "ratio of reducing sugars" refers to the amount of reducing sugars present in the final protein hydrolyzate at the moment of completion of enzymatic hydrolysis. The amount of reducing sugars can be adjusted to 5 % or less by performing the reaction at a temperature ranging from 15 °C to 39 °C for a certain period of time and then further performing the reaction at a temperature ranging from 40 °C to 60 °C, i.e., by controlling the time at which the temperature of the reaction is raised. During the hydrolysis at 15 °C to 39 °, reducing sugars are assimilated by the fungus and the content of reducing sugars in the final reaction product is decreased accordingly.

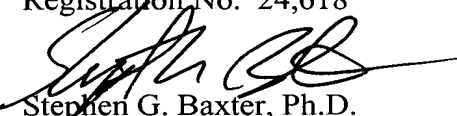
Lastly, Applicants note that FORM PCT/DO/EO/903 indicates that copies of the both the International Search Report and the references cited therein have been received by the USPTO. However, the Official Action contains no indication that the references cited in the International Search Report have been considered. Accordingly, Applicants respectfully request that the Examiner indicate that the references cited in the International Search Report have been considered in the next communication from the USPTO.

Applicants submit that the application is now in condition for allowance, and early notification of such action is earnestly solicited.

Respectfully submitted,

OBLON, SPIVAK, McCLELLAND,  
MAIER & NEUSTADT, P.C.

Norman F. Oblon  
Attorney of Record  
Registration No. 24,618



Stephen G. Baxter, Ph.D.  
Registration No. 32,884



**22850**

(703) 413-3000  
Fax #: (703) 413-2220  
SGB/rac

I:\atty\SGB\197748US.Amend02.Oct01.wpd

197748US0 PCT

**Marked-Up Copy**

Serial No: 09/674,280

Amendment Filed on:

October 29, 2001

IN THE CLAIMS

Please cancel Claims 1-6, without prejudice toward the further prosecution of these claims in a Continuation and/or Divisional application.

Please add the following new claims:

--7. (New) to 26. (New)--